

FORM PTO 1390 (REV 5-99)		US DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY DOCKET NUMBER 2001_0263A	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. §371				U.S. APPLICATION NO. (if known, use 35 U.S.C. 1.5) NEW 099787301	
International Application No. PCT/NO99/00283		International Filing Date September 15, 1999		Priority Date Claimed September 16, 1998	
Title of Invention METHOD FOR PREPARING A CH <sub>4</sub> -RICH GAS AND A CO <sub>2</sub> -RICH GAS AT HIGH PRESSURE					
Applicant(s) For DO/EO/US: Ola OLSVIK					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
<p>1. <input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. §371.</p> <p>2. <input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. §371.</p> <p>3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. §371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. §371(b) and PCT Articles 22 and 39(1).</p> <p>4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. §371(c)(2)) (in English)</p> <p>a. <input type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).</p> <p>b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau.</p> <p>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US)</p> <p>6. <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. §371(c)(2)).</p> <p>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3)).</p> <p>a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).</p> <p>b. <input type="checkbox"/> have been transmitted by the International Bureau.</p> <p>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</p> <p>d. <input checked="" type="checkbox"/> have not been made and will not be made.</p> <p>8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19.</p> <p>9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. §371(c)(4)).</p> <p>10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. §371(c)(5)).</p> <p>Items 11. to 14. below concern other document(s) or information included:</p> <p>11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</p> <p>13. <input checked="" type="checkbox"/> A FIRST preliminary amendment.</p> <p><input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.</p> <p>14. <input checked="" type="checkbox"/> Other items or information: (a) Form PCT/IB/308; (b) International Search Report; (c) Published International Application (WO 00/18681); and (d) International Preliminary Examination Report (5 pages).</p>					

U.S. APPLICATION NO. **09/787301**  
NEW

INTERNATIONAL APPLICATION NO.  
PCT/NO99/00283

ATTORNEY'S DOCKET NO.  
2001 0263A

15. [X] The following fees are submitted

**BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):**

Neither international preliminary examination fee nor international search fee paid to USPTO  
and International Search Report not prepared by the EPO or JPO ..... \$1000.00  
International Search Report has been prepared by the EPO or JPO ..... \$ 860.00  
International preliminary examination fee not paid at USPTO but international search  
paid to USPTO ..... \$ 710.00  
International preliminary examination fee paid to USPTO but claims did not satisfy provisions  
of PCT Article 33(1)-(4) ..... \$ 690.00  
International preliminary examination fee paid at USPTO and all claims satisfied provisions of  
PCT Article 33(1)-(4) ..... \$ 100.00

**ENTER APPROPRIATE BASIC FEE AMOUNT =**

\$1,000.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest  
claimed priority date (37 CFR 1.492(e)).

\$

Claims	Number Filed	Number Extra	Rate
Total Claims	20 -20 =	0	X \$18.00
Independent Claims	1 - 3 =	0	X \$80.00
Multiple dependent claim(s) (if applicable)			+ \$270.00

\$1,000.00

**TOTAL OF ABOVE CALCULATIONS =**

☐ Small Entity Status is hereby asserted. Above fees are reduced by 1/2.

\$

**SUBTOTAL =**

\$1,000.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest  
claimed priority date (37 CFR 1.492(f)).

\$

**TOTAL NATIONAL FEE =**

\$1,000.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an  
appropriate cover sheet (37 CFR 3.28, 3.31). \$40 per property +

\$40.00

**TOTAL FEES ENCLOSED =**

\$1,040.00

Amount to be refunded \$

Amount to be charged \$

a. [X] A check in the amount of \$1,040.00 to cover the above fees is enclosed. A duplicate copy of this form is enclosed.

b. ☐ Please charge my Deposit Account No. 23-0975 in the amount of \$\_\_\_\_\_ to cover the above fees.  
A duplicate copy of this sheet is enclosed.

c. ☐ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any  
overpayment to Deposit Account No. 23-0975.

**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or  
(b)) must be filed and granted to restore the application to pending status.

19. CORRESPONDENCE ADDRESS



000513

PATENT TRADEMARK OFFICE

By:

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March 16, 2001

THE COMMISSIONER IS AUTHORIZED  
TO CHARGE ANY DEFICIENCY IN THE  
FEES FOR THIS PAPER TO DEPOSIT  
ACCOUNT NO. 23-0975

[CHECK NO. 4358]

[2001\_0263A]

09/787301

JC03 Rec'd PCT/PTO 16 MAR 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of :  
Ola OLSVIK : Attn: BOX PCT  
Serial No. NEW : Docket No. 2001\_0263A  
Filed March 16, 2001 :  
METHOD FOR PREPARING A H<sub>2</sub>-RICH :  
GAS AND A CO<sub>2</sub>-RICH GAS AT HIGH :  
PRESSURE :  
[Corresponding to PCT/NO99/00283 :  
Filed September 15, 1999] :

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents  
Washington, DC 20231

Sir:

Please amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 1, after the title of the invention, please insert

--This application is a 371 application of PCT/NO99/00283 filed September 15, 1999.--

IN THE CLAIMS:

Please amend the following claims as indicated:

3(amended). Method according to claim 1,

characterized in that the pressure in the reforming reactor is from about 200 to about 500 bar.

4(amended). Method according to claim 1,

characterized in that the CO<sub>2</sub>-rich gas stream is present at a pressure within the interval from 20 to 200 bar.

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5(amended). Method according to claim 1,  
characterized in that the mixture in the reforming reactor is passed over a catalyst bed.

6(amended). Method according to claim 1,  
characterized in that the reaction in the reforming reactor is carried out without a  
catalyst.

Please add the following new claims:

--11(new). Method according to claim 2,  
characterized in that the pressure in the reforming reactor is from about 200 to about  
500 bar.

12(new). Method according to claim 2,  
characterized in that the CO<sub>2</sub>-rich gas stream is present at a pressure within the interval  
from 20 to 200 bar.

13(new). Method according to claim 3,  
characterized in that the CO<sub>2</sub>-rich gas stream is present at a pressure within the interval  
from 20 to 200 bar.

14(new). Method according to claim 2,  
characterized in that the mixture in the reforming reactor is passed over a catalyst bed.

15(new). Method according to claim 3,  
characterized in that the mixture in the reforming reactor is passed over a catalyst bed.

16(new). Method according to claim 4,  
characterized in that the mixture in the reforming reactor is passed over a catalyst bed.

17(new). Method according to claim 2,  
characterized in that the reaction in the reforming reactor is carried out without a  
catalyst.

18(new). Method according to claim 3,  
characterized in that the reaction in the reforming reactor is carried out without a  
catalyst.

19(new). Method according to claim 4,  
c h a r a c t e r i z e d i n that the reaction in the reforming reactor is carried out without a  
catalyst.

20(new). Method according to claim 5,  
c h a r a c t e r i z e d i n that the reaction in the reforming reactor is carried out without a  
catalyst.--

### R E M A R K S

The specification has been amended to insert a cross-reference to the international  
application on which the present U.S. application is based.

The claims have been amended to correct their improper multiple dependency, as a result  
of which new claims 11-20 have been added to the application.

Attached hereto is a marked-up version of the changes made to the claims by the current  
Preliminary Amendment. The attached page is captioned "Version with markings to show  
changes made."

Respectfully submitted,

Ola OLSVIK

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March 16, 2001

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ACCOUNT NO. 23-0975

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS:**

3(amended). Method according to [claims 1-2] claim 1,  
c h a r a c t e r i z e d i n that the pressure in the reforming reactor is from about 200 to about 500 bar.

4(amended). Method according to [claims 1-3] claim 1,  
c h a r a c t e r i z e d i n that the CO<sub>2</sub>-rich gas stream is present at a pressure within the interval from 20 to 200 bar.

5(amended). Method according to [claims 1-4] claim 1,  
c h a r a c t e r i z e d i n that the mixture in the reforming reactor is passed over a catalyst bed.

6(amended). Method according to [claims 1-5] claim 1,  
c h a r a c t e r i z e d i n that the reaction in the reforming reactor is carried out without a catalyst.

1/PATS

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**Method for preparing a H<sub>2</sub>-rich gas and a CO<sub>2</sub>-rich gas at high pressure.**

The present invention comprises a method for production of a CO<sub>2</sub>-rich gas for injection purposes or to be deposited, and a hydrogen-rich gas, and use thereof.

5 It is commonly assumed that the greenhouse effect and the climate on earth have are closely connected to human made emissions of CO<sub>2</sub>. These emissions are primarily formed by combustion of coal and hydrocarbons, i.a. by generation of heat and electric power. A desirable goal is therefore to reduce the emission of CO<sub>2</sub> to the atmosphere.

10 It is known art to reduce the emission of CO<sub>2</sub> from combustion of natural gas, e.g. by gas reforming and shift technology for preparation of a mixture consisting of hydrogen and carbon dioxide. These components are then separated, whereafter hydrogen is used as fuel in a gas turbin and carbon dioxide is deposited after compression to desired pressure. The deposition can be made on the  
15 bottom of the sea or in geological reservoirs. The reservoirs can also contain hydrocarbons. The above mentioned technique is i.a. described in Teknisk Ukeblad No. 16, page 8, 1998.

Known art comprising gas reforming and shift technology as described above is very expensive and at the same time gives less energy yield than a  
20 conventional, modern gas power plant.

US 3,652,454 describes preparation of CO<sub>2</sub> and H<sub>2</sub> from a gas stream containing CO by an improved continuous catalytical shift reaction at high pressure. The reaction takes place i one or more shift reactors at a superatmospheric pressure of from 35 to 250 atmospheres, and a temperature between 287°C and  
25 537°C. The patent does not describe reforming of natural gas.

From EP 0 000 993-A1 it is known a method for preparation of ammonia by means of a primary and a secondary catalytic reforming of an hydrocarbon stream at superatmospheric pressure. From the primary catalytic reforming the ratio of steam to carbon is from 2.5 to 3.5, the pressure is from 30 to 120 bar and  
30 the temperature out of the reactor is from 750 to 850°C. From the secondary catalytic reforming the content of methane is from 0.2 to 10 % by weight on a dry

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basis and the ratio of hydrogen to nitrogen is from 2.2 to 2.7. To the he secondary reforming there is added an excess of air for preparing a gas with a higher content of methane, i.e. at a lower temperature, and/or a lower steam ratio and/or a higher pressure. In the above mentioned EP patent CO<sub>2</sub> is removed at a low pressure by taking out hydrogen at an elevated pressure for further use by the preparation of ammonia.

EP 0 289 419 describes catalytic steam reforming of hydrocarbons for preparing hydrogen i an ammonia process. The catalytic steam reforming takes place at a pressure from 25 to 120 bar, a temperature from 800 to 1000°C and at at ratio steam:carbon of 1.8-2.5. The process is operated in such a way that there are less than 0.3% impurities in the H<sub>2</sub>-rich gas which is to be used for production of ammonia. The present invention allows a higher content than 0.3% of CO, CO<sub>2</sub> and CH<sub>4</sub> in the H<sub>2</sub>-rich gas stream.

CA 868,821 describes preparation of synthesis gas by steam reforming of hydrocarbons in a gas and a liquid at 50-250 absolute atmospheres, preferably 160 abs. atm. for production of ammonia and methanol.

Known art does not deal with a one step prosess for production av CO<sub>2</sub>-rich gas and H<sub>2</sub>-rich gas under supercritical conditions for water, where a CO<sub>2</sub>-rich gas mixture is taken out at an elevated pressure in the interval from 20 to 200 bar for injection or deposition i marine formations. The present invention involves reduced compression costs by deposition or injection in marine formations because the CO<sub>2</sub>-rich gas mixture is taken out at an elevated pressure.

The present invention comprises a method for preparing a CO<sub>2</sub>-rich gas stream and a hydrogen rich gas stream, the method comprising the following steps:

- a) natural gas and H<sub>2</sub>O are fed to a one-step reforming process for preparing a gas mixture comprising CO<sub>2</sub> and H<sub>2</sub> under supercritical conditons for water;
- b) the gas mixture from a) is separated into a H<sub>2</sub>-rich and a CO<sub>2</sub>-rich gas stream, respectively.

Further the temperature in the reforming reactor is from about 400°C to about 600°C, and the method is also characterized by a pressure in the reform-



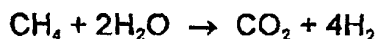
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ing reactor from about 200 to about 500 bar. The CO<sub>2</sub>-rich gas stream from the separation unit is at a pressure in the interval from 20 til 200 bar. I the present invention the mixture in the reforming reactor may be passed over a catalyst bed. The reforming can also be carried out without catalyst. The present invention  
5 also concerns use of the CO<sub>2</sub>-rich gas stream prepared according to the previously mentioned method, where the CO<sub>2</sub>-rich gas stream is injected into marine formations. Further, the invention comprises use of the H<sub>2</sub>-rich gas stream prepared according to the invention, where the H<sub>2</sub>-rich gas stream can be utilized for hydrogenation, i the production of electricity and as a source of energy / fuel in  
10 fuel cells.

The following reaction takes place during the reforming:



The reforming reactor is operated at supercritical conditions for water. The temperature in the reforming reactor is from about 400°C to about 600°C and the  
15 pressure in the reforming reactor is from about 200 to about 500 bar. It is an object of the present invention that CO<sub>2</sub> is separated from the gas stream at a pressure of at least 20 bar and maximum 200 bar before being injected into marine formations or by deposition. The reforming reaction takes place over a suitable catalyst bed. The reforming can also take place without catalyst in the reforming  
20 reactor. It is also an object of the present invention to use H<sub>2</sub> made according to the method of the invention, for hydrogation, and for production of electricity. Use of H<sub>2</sub> as a source of energy / fuel in fuel cells is further comprised by the present invention.

CO<sub>2</sub> is an acid gas, and the most widely used method to separate the  
25 mentioned gas from other non-acid gas molecules is absorption. During absorption the different chemical properties of the gas molecules are utilized. By contacting the gas mixture with a basic liquid the acid gases to a high degree will be dissolved in the liquid. The liquid is separated from the gas and the absorbed gas can the be set free either by altering the composition of the liquid or by altering  
30 pressure and temperature. For separation of CO<sub>2</sub> mainly aqueous solutions of alcoholamines are used. The absorption is taking place at a relatively low temperature and high pressure, while stripping of the gas from the liquid is carried

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out at a relatively high temperature and low pressure. To liberate CO<sub>2</sub> from the amine phase in the stripping unit stripping steam is usually used. If the partial pressure of CO<sub>2</sub> in the gas into the absorber is high, e.g. higher than 15 bar, it is possible to obtain high concentrations in the amine phase, and a large part of absorbed CO<sub>2</sub> can be set free in the stripping unit at elevated pressure, e.g. 5-8 bar.

By the use of one or more semipermeable membrane units it is possible to achieve that molecules of different molecular weight and different properties permeate the membrane at different velocities. This principle can be utilized to separate gases. For the gas mixture in question membranes can be selected where H<sub>2</sub> permeates rapidly, whereas CO<sub>2</sub> permeates slowly, whereafter a separation-in-part of the different gas components is achieved. By combining solid membranes and liquid membranes it is also possible to achieve a rapid permeation of CO<sub>2</sub>, while H<sub>2</sub> is kept back. It can be difficult to achieve complete separation of the different gas components by using different separation methods. This is especially the case by use of membranes. For gas mixtures which are going to be burned, a partly separation of hydrogen and CO<sub>2</sub> will be sufficient.

In the present invention it is desirable to deposit out-separated CO<sub>2</sub>. Large amounts of CO<sub>2</sub> can be deposited according to various methods, of which the three most interesting are deposition at very deep oceans, deposition in deep water reservoirs and deposition in oil reservoirs wherein the gas at the same time functions as drive agent for enhanced oil recovery. The two last mentioned storage methods are operated commercially. In these storage forms the CO<sub>2</sub> gas has to be brought to high pressure for transport in pipelines to a deposition well and further to injection. The injection pressure will vary, but could be in the range 50 to 300 bar. If the CO<sub>2</sub> gas can be separated from the H<sub>2</sub>/CO<sub>2</sub> mixture at an elevated pressure, significant compression work can be avoided, and this is the case in the present invention.

The invention is further elucidated on Figure 1. Natural gas (1) is passed from an oil/gas field, and blended with H<sub>2</sub>O (2) before the mixture is passed to reforming at supercritical conditions. Produced synthesis gas (3) is separated at high pressure into two streams, a CO<sub>2</sub>-rich stream (5), which is injected into an

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oil/gas field, and a H<sub>2</sub>-rich stream (4), respectively The H<sub>2</sub>-rich stream is further used for hydrogenation, as a source of energy in fuel cells, and for production of electricity.

5 **Example 1:**

The example concerns one or more membrane units wherein the CO<sub>2</sub>-rich gas can have a pressure approximately equal to the partial pressure of CO<sub>2</sub> into the separation unit, as shown in Table 1 below.

10

Table 1

Total inlet pressure on the separation unit (bar)	Partial pressure of CO <sub>2</sub> out of the separation unit (bar)
200	40
250	50
300	60

**Example 2:**

Supercritical conditions occur at pressures above 220 bar and temperatures above 374°C.

15 In this example it is described at which conditions supercritical conditions occur in the present reactor.

The relationship between temperatur and pressure in the reactor in the present invention is as shown in Table 2. Supercritical conditions occur in the reactor when the values of pressure and temperatur are higher than shown in

20 Table 2.

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Table 2

Pressure (bar)	Temperature (°C)
1100	354
750	356
500	362
300	368
220	374

Relationship between temperature and % fraction  $H_2O$  at 220 bar is shown in table 3. Supercritical conditions occur in the reactor when the values for temperature and % fraction  $H_2O$  at a pressure of 220 bar are higher than shown in Table 3.

Table 3

% fraction $H_2O$ (P = 220 bar)	Temperature (°C)
0.95	372
0.85	365
0.75	353

The relationship between pressure and % fraction  $H_2O$  at a temperature of 374°C is shown in Table 4. Supercritical conditions occur in the reactor when the values for pressure and % fraction  $H_2O$  at 374°C are higher than shown in Table 4.

Table 4

% fraction $H_2O$ (T= 374°C)	Pressure (bar)
0.95	300
0.85	400
0.75	1000

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## Claims

1. Method for preparing a CO<sub>2</sub>-rich gas stream for injection purposes or deposition, and a hydrogen rich gas stream,  
5 characterized in that the method comprises the following steps:  
a) natural gas and H<sub>2</sub>O are fed into to a one-step reforming process for preparing a gas mixture comprising CO<sub>2</sub> and H<sub>2</sub> under supercritical conditons for water;  
b) the gas mixture from a) is separated into a H<sub>2</sub>-rich and a CO<sub>2</sub>-rich gas  
10 stream, respectively.
2. Method according to claim 1,  
characterized in that the temperature in the reforming reactor is from  
about 400°C to about 600°C.  
15
3. Method according to claims 1-2,  
characterized in that the pressure in the reforming reactor is from  
about 200 to about 500 bar.
- 20 4. Method according to claims 1-3,  
characterized in that the CO<sub>2</sub>-rich gas stream is present at a pressure  
within the interval from 20 to 200 bar.
5. Method according to claims 1-4,  
25 characterized in that the mixture in the reforming reactor is passed  
over a catalyst bed.
6. Method according to claims 1-5,  
characterized in that the reaction in the reforming reactor is carried out  
30 without a catalyst.
7. Use of a CO<sub>2</sub>-rich gas stream according to claim 1 for injection into marine formations.

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8. Use of a H<sub>2</sub>-rich gas stream made according to claim 1 for hydrogenation.
9. Use of a H<sub>2</sub>-rich gas stream made according to claim 1 as a source of energy / fuel in fuel cells.
10. Use of a H<sub>2</sub>-rich gas stream made according to claim 1 for production of electricity.

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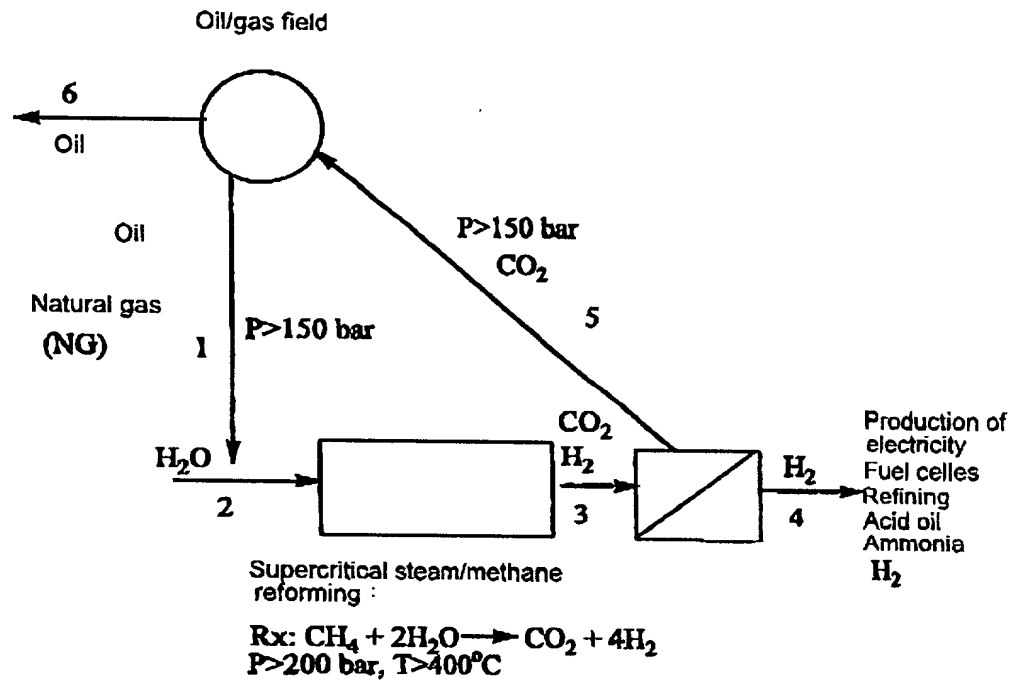


Figure 1

Rev. 11-3/98

Effective October 1997

**DECLARATION AND POWER OF ATTORNEY FOR U.S. PATENT APPLICATION**

( ) Original ( ) Supplemental ( ) Substitute (X) PCT ( ) Design

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that I verily believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Title: Method for preparing a H<sub>2</sub>-rich gas and a CO<sub>2</sub>-rich gas at high pressure

of which is described and claimed in:

- ( ) the attached specification, or  
( ) the specification in the application Serial No. \_\_\_\_\_ filed \_\_\_\_\_;  
and with amendments through \_\_\_\_\_ (if applicable), or  
(X) the specification in International Application No. PCT/ NO99/00283, filed Sept. 15, 1999, and as amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the content of the above-identified specification, including the claims, as amended by any amendment(s) referred to above.

I acknowledge my duty to disclose to the Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim priority benefits under Title 35, United States Code, §119 (and §172 if this application is for a Design) of any application(s) for patent or inventor's certificate listed below and have also identified below any application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

COUNTRY	APPLICATION NO.	DATE OF FILING	PRIORITY CLAIMED
Norway	NO 1998 4296	September 16, 1998	YES

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

APPLICATION SERIAL NO.	U.S. FILING DATE	STATUS: PATENTED, PENDING, ABANDONED



And I hereby appoint Michael R. Davis, Reg. No. 25,134; Mathew M. Jacob, Reg. No. 25,154; Warren M. Cheek, Jr., Reg. No. 33,362; Nils Pedersen, Reg. No. 33,145; Charles R. Watts, Reg. No. 33,142; and Michael S. Huppert, Reg. No. 40,268, who together constitute the firm of WENDEROTH, LIND & PONACK, L.L.P., jointly and severally, attorneys to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith.

I hereby authorize the U.S. attorneys named herein to accept and follow instructions from Bryn & Aarflo AS as to any action to be taken in the U.S. Patent and Trademark Office regarding this application without direct communication between the U.S. attorneys and myself. In the event of a change in the persons from whom instructions may be taken, the U.S. attorneys named herein will be so notified by me.

Send Correspondence to

Direct Telephone Calls to:

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I further declare that all statements made herein of my own knowledge are true, and that all statements on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

1st Inventor Ola OLSVIK Date 16.02.2001  
 2nd Inventor \_\_\_\_\_ Date \_\_\_\_\_  
 3rd Inventor \_\_\_\_\_ Date \_\_\_\_\_  
 4th Inventor \_\_\_\_\_ Date \_\_\_\_\_  
 5th Inventor \_\_\_\_\_ Date \_\_\_\_\_  
 6th Inventor \_\_\_\_\_ Date \_\_\_\_\_  
 7th Inventor \_\_\_\_\_ Date \_\_\_\_\_

The above application may be more particularly identified as follows:

U.S. Application Serial No. \_\_\_\_\_ Filing Date \_\_\_\_\_  
 Applicant Reference Number 103870/TFM Atty Docket No. \_\_\_\_\_  
 Title of Invention Method for preparing a H<sub>2</sub>-rich gas and a CO<sub>2</sub>-rich gas  
at high pressure